

lines the more elementary theory of magnetism, permanent and induced, with a brief sketch of the general theory of terrestrial magnetism. Chapters x., xi., xii. take up respectively electric currents, dielectrics, and the electromagnetic theory of light. The exposition is clear throughout, and well adapted to a student reading the subject for the first time. At the same time it will probably be felt by many that the book would have appealed to a wider audience if the spherical harmonic methods mathematically developed had been applied to definite problems in electrical or magnetic distributions. The author, however, is quite consistent in this neglect of practical applications; for although chapter xii. ends with the statement that the ratio of the electromagnetic to the electrostatic unit of electric charge is approximately 3×10^{10} , it is nowhere stated that this is the numerical value of the velocity of light.

(3) Mr. E. H. Smart's "First Course in Projective Geometry" is both well planned and well written. With the exception of a brief introduction to the method of projection in space, the first six chapters are devoted to the plane geometry of triangles, quadrilaterals, and circles, in which the principles of correspondence and duality, harmonic ranges, inversion, similitude, poles and polars, are developed in a systematic manner. In chapter vii. further theorems and problems on projection are given, and these suffice for what the author regards as the main purpose of his book, namely, a logical, coherent discussion of the geometry of the conic sections. In the later chapters the principle of duality is freely introduced, and the book finishes with typical examples of reciprocation. Most of the chapters contain brief historic notes which cannot fail to interest the student.

OUR BOOKSHELF.

Materials and Methods in High School Agriculture. By Prof. W. G. Hummel and Bertha R. Hummel. Pp. xi + 385 + plates. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1913.) Price 5s. 6d. net.

In discussing the scope of their work the authors begin with a definition of the object of agricultural work in elementary schools and also in the universities. They then find that the position of agriculture in high schools lies intermediately between these two positions. The purposes of agricultural work in the elementary schools are stated to be the opening of the minds of children to the common phenomena of nature, the inculcation of habits of observation, and the setting up of higher ideals in country life, but not to make farmers or farm labourers. In the colleges, on the other hand, the work lies in the investigation of the more fundamental problems of agricultural science and practice. The high schools should

teach practical agriculture, educating their students for the actual business of the farmer; the course should not, however, be narrowly vocational, but should be cultural and disciplinary as well, and should prepare the students to be broad-minded and intelligent, progressive citizens.

Considerable stress is laid upon the necessity for finding suitable teachers; the teacher must not only possess agricultural knowledge, but be able to impart it to others. Neither the purely scientific man nor the purely practical man has turned out a success. The former fails because he lacks the proper point of view, and knows nothing of practical farming conditions; the latter fails because he does not know the first principles of the subject, and is unacquainted with the scientific basis of agriculture.

The book is full of interest, and can be cordially recommended to all who are engaged in the work of agricultural education at schools, farm institutes, and colleges.

The Deciding Voice of the Monuments in Biblical Criticism. By Dr. M. G. Kyle. Pp. xvii + 320. (London: S.P.C.K., 1912.) Price 4s. net.

THE author of this work would probably not resent the suggestion that he writes as an advocate or partisan, rather than as an impartial assessor, in a long-drawn-out dispute. The field he surveys is a well-trodden one—the relation between the Bible and the monuments—and his attitude is that of the most traditional and conservative of writers on this subject. His thesis throughout is to the effect that modern archaeological study has entirely disposed of the claims advanced on behalf of the textual criticism of the Old Testament. In his view the whole work of the critical school is discredited, and the labours of Hebrew scholars for more than a century past, so far from resulting in a truer and more accurate appreciation of the Hebrew text, have been worse than useless. His position may be indicated by the fact that he maintains the unity of the book of Isaiah, and holds that the book of Daniel embodies the prophecies of a historic person of that name who prophesied in Babylon during the exile, and was written by him or by one of his contemporaries. It does not lie within the scope of this journal to follow the author along his controversial path. But with the best will in the world to be convinced, we cannot help feeling that he is engaged in that rather pathetic process of trying to put back the hands of the clock. We feel sure he would have been far more convincing had he proved himself a less thorough-going partisan.

Astronomy. By Ellison Hawks. Pp. 120. (Manchester: Milner and Co., n.d.) Price 1s. net.

In these 120 pages the author presents the subject of astronomy in such a way that the beginner will wish to carry his reading further. The style is elementary, clear, and chatty, and the reader is led on from one subject to another in a natural

sequence. He is first introduced to the astronomy of the ancients, and then of to-day. The historical account of the telescope is followed by the practical forms of to-day, leading up to the famous observations of the present time. Then follow concise statements about the sun, moon, planets, comets, stars, coloured and multiple, clusters and nebulae, &c., all of which are sufficient to give the reader an interest in the subject and a wish to know more about them. Many practical hints and much good advice are given which will be serviceable to those who are making use of small telescopes. Numerous well-chosen illustrations, many of which are from the pencil of the author, accompany the text. A glossary of astronomical terms, a brief bibliography of the more elementary astronomical books and an index bring this practical little book to a conclusion.

The Petrology of the Igneous Rocks. A Summary of the modern Theories of Petrogenesis, a Description of the Rock-forming Minerals, and a Synopsis of the chief Types of the Igneous Rocks and their Distribution as illustrated by the British Isles. By Dr. F. H. Hatch. Seventh edition, revised. Pp. xxiv + 454. (London: George Allen and Co., Ltd., 1914.) Price 7s. 6d. net.

ATTENTION has been directed in these columns to this now well-known text-book on two previous occasions. On May 14, 1891 (vol. xlv., p. 25), the first edition was reviewed at length, and on May 20, 1909 (vol. lxxx., p. 337), the fifth edition was noticed. It will be sufficient to say of the present edition that it has undergone considerable revision and that new chapters on the pyroclastic rocks and the metamorphic derivatives of the igneous rocks have been added, together with numerous new illustrations.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Active Nitrogen.

A PAPER appears in the *Berichte* (vol. xxxvi., 17, p. 4095, 1914), by E. Tiede and Domcke, in which it is again maintained that the glow characteristic of active nitrogen is not seen in the absence of oxygen. In the experiment chiefly relied on, the authors prepare nitrogen in an exhausted apparatus, by heating barium or potassium azide; and they lead it through a cooled vessel straight into the discharge tube, also exhausted. They state that after careful washing out with nitrogen, no afterglow appears. We do not know how to account for their conclusion, but we can only state that in our hands the experiment gives exactly the opposite result. We used potassium azide, and after most thoroughly heating the glass and the electrodes and washing out the vessel repeatedly with nitrogen, the glow remained absolutely undiminished in intensity.

We have also tried a new experiment. Some of the

liquid alloy of sodium and potassium was placed in a discharge bulb, which was charged with rarefied nitrogen. The surface of the alloy is quite bright, and the nitrogen has been standing over it for three weeks, but the afterglow is as good or better than ever. Fuller details of these experiments will be published later.

Finally, even if what Tiede and Domcke say were true (which we entirely deny), we do not see that it would alter the fact that a gas has been obtained by one of us capable of reacting in the cold with, e.g. hydrocarbons to form hydrocyanic acid. If this is not active nitrogen, what is it?

H. B. BAKER.

R. J. STRUTT.

Imperial College of Science, February 10.

Weather Forecasting.

MR. DEELEY'S plea (*NATURE*, January 29) for increased aid to meteorology certainly deserves serious consideration. Under the present condition of affairs it is not possible to issue forecasts for more than a day or two in advance with much hope of success, but there is no reason why this should continue indefinitely. Seasonal forecasts would be of immense importance to agriculture, more so, indeed, than forecasts for the following week, because, were the character of an ensuing summer known, it would be nearly always possible to plant crops that would thrive under the expected conditions. It is quite possible that if we had a sufficiency of good charts covering the greater part of the earth, seasonal forecast might be made empirically, just as daily forecasts now are, and were they as successful as the present daily forecasts, the occasions on which a fairly good harvest could not be secured would be few, for it is seldom that the weather is not favourable for some one or two crops.

The key to the whole situation lies in being able to foretell the distribution of pressure. Being given a chart with the isobars on it, it is possible to fill in a great deal more with fair certainty.

But at present we are hopelessly in the dark as to the reasons of cyclones and anticyclones, why they form and why they move. The investigation of the upper air has led to this, that all our old theories about cyclones and anticyclones must go to the scrap-heap. It has been usual, and is still for that matter, to explain a high or low barometer by saying that the air over them is respectively cold or hot. The exact opposite is the fact. If the barometer in Europe at a certain place is very low it is a practical certainty that the greater part of the mass of air lying over that place will be very much colder, and therefore heavier than usual. Facts of this sort have to be explained before we can hope to advance much farther.

But there is very good hope for the future. If the upper air investigation has entirely altered our ideas as to the cause of pressure changes, it has also shown that the conditions prevailing above are far more simple than they are below. If an isobaric chart for a height of 9 km. for Europe could be drawn for a given date, that chart would enable us to fill in with fair accuracy the temperatures, and therefore also the pressures, for the space covered between the heights of 1 km. and 20 km. Higher than 20 km. the observations do not go, and below 1 km. the conditions are exceedingly complex, but within the limits given the temperatures do not differ very far from linear functions of the pressure at 9 km.

It seems, therefore, as though the surface changes are a sort of by-product of the changes occurring above, but the outstanding puzzle is what produces and maintains the changes of pressure above.